Energy Efficiency and Renewable Energy
Federal Energy Management Program

How to Buy an Energy-Efficient Personal Computer

Why Agencies Should Buy Efficient Office Equipment

- *Executive Order 13123 and FAR section 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE ENERGY STAR® product labeling program.*
- *Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.*
- *As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.*

Federal Supply Source:

- General Services Administration (GSA)
  www.fss.gsa.gov

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
  Phone: (800) 363-3732
  www.eren.doe.gov/femp/procurement
- Environmental Protection Agency (EPA) has ENERGY STAR® product listings and purchasing specifications.
  Phone: (888) STAR-YES (782-7937)
  www.energystar.gov
- EPA's "ENERGY STAR-labeled office equipment" home page has several downloadable guides to help users optimize energy savings from office equipment.
  www.epa.gov/appdstar/esoe/index.html
- TCO is a labeling program for computers, monitors, and other office equipment that includes energy efficiency, environmental, and ergonomic criteria, as well as low electro-magnetic emissions.
  Phone: (312) 781-6223
  www.tco-info.com
- Lawrence Berkeley National Laboratory publishes the *User Guide to Power Management for PCs and Monitors*.
  Phone: (510) 486-7089
  eetd.lbl.gov/EAP/BEA/LBLReports/39466/
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
  Phone: (202) 646-7950

Efficiency Recommendation

Maximum Continuous Power Supply Rating (or system type)	Recommended "Sleep" Mode Power[a]
≤ 200 watts	15 watts or less
201 - 300 watts	20 watts or less
301 - 350 watts	25 watts or less
351 - 400 watts	30 watts or less
> 400 watts	≤ 10% of max. power supply rating
PC/Monitor ("all in one")	35 watts or less

a) For computers shipped with networking capability that require the processor or memory to be involved in maintaining the network connection during sleep mode, the recommended sleep mode is 15% of the maximum power supply rating.

Definition

"Sleep" mode refers to a low-power standby condition, which is entered automatically after a set period of inactivity. The computer's active mode is restored when the user touches the mouse or keyboard, or in response to a network signal.

Where to Find Energy-Efficient Computers

The federal supply source for computers is the General Services Administration (GSA). GSA's on-line ordering system, *Advantage!*, can be used to select and order computers. Make sure that the model you order qualifies for the ENERGY STAR® label. All ENERGY STAR computers meet this Efficiency Recommendation. When contracting or buying from a commercial source, specify or select a model with the ENERGY STAR® label.

Buyer Tips

Make sure that your PC power management features have been enabled by the supplier or installer, and are compatible with your monitor, software, and network (see LBNL's *User Guide* under "For More Information").

Laptop PCs offer many of the same features as desktop models, plus portability. However, combining a laptop with an external monitor or docking station will increase power use.

Usage Tips

Use your computer software to set the "idle time" delay to the shortest period consistent with your needs (for example, to switch to sleep mode after ten minutes).

Even for PCs with a low-power sleep mode, you can save more energy and possibly extend your computer's lifetime if you manually shut it off at night, on weekends, and during long periods of non-use during the day. If your networked computer(s) must stay on and connected at night for file backup or other purposes, make sure the monitor is shut off. Look for network features that provide a timed shutdown, automatic shutdown after file backup, or alternatively, auto-boot-up before backup. Using sleep and off modes will not shorten your PC's lifetime.

Plug-in power supplies for laptop PCs typically use 15 watts or less but cannot be shut off completely. To save energy, unplug your power supply after the laptop battery is charged, or use a power strip with an on-off switch.

Many laptop PCs (and some desktops) offer a "hibernate" or "bookmark" feature, which saves active programs and files before shutting off, then restores the same status when the PC is turned on. This added convenience encourages users to shut off their computers when not in use.

Computer Cost-Effectiveness Example
(Desktop PC, 500+ Mhz, 300 W Power Supply)

Performance	Base Model (No Power Management)	Recommended Level (Power Management Enabled)
Annual Energy Use	252 kWh	133 kWh
Annual Energy Cost	$15	$8
Lifetime Energy Cost	$53	$28
Lifetime Energy Cost Savings[a]	–	**$25**

a) These savings do not include the benefit from reduced air-conditioning costs, which depend on location and building type.

Definition

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed computer life of 4 years. Future electricity price trends and a discount rate of 3.4% are based on federal guidelines (effective from April, 2000 to March, 2001).

Cost-Effectiveness Assumptions

Annual energy use in the above example is based on typical office operating practices, including a 9.5 hour work day (in active use 4 hours/day) and 250 work days per year. Also, the example incorporates the assumption that 76% of personal computers are turned on during a typical business day and 35% left on overnight and on weekends. The assumed electricity price is 6¢/kWh, the federal average electricity price in the U.S.

Using the Cost-Effectiveness Table

In the example shown above, a personal computer at the Recommended efficiency level is cost-effective if its purchase price is no more than $25 above the price of the Base Model. Adding ENERGY STAR® features (power management) to a computer does not add significantly to the cost.

What if my Electricity Price or Usage is different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: $\left(\frac{Your\ price\ in\ ¢/kWh}{6.0\ ¢/kWh}\right)$. If usage of your computer differs from the assumptions shown above, your energy operating costs and savings will also vary. For example, if the computer is left on constantly, the savings from a low-power sleep mode are substantially greater.